PINs and PDDs developed for the 3 regular CDM projects

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Outline

- Approach of PIN development for regular CDM project
- **PIN introduction - Plant oil**
- **PIN introduction - LED**
- **PIN introduction - Biomass**
- **PDD Development for regular CDM project**

Approach of PIN development for regular CDM project

- **Project Screening**
  - Widely information collection
  - Narrow focus according to project feasibility study, sector development strategy policy, resource assessment report, previous CDM project development, etc.
  - Fully use the process to map out key risks, drivers, and uncertainties and to identify and engage project champions and affected stakeholders

Approach of PIN development for regular CDM project

- **Key factors to be assessed for a potential project**
  - Technology and sector scope
  - Scale
  - Potential project developer and its experience
  - Access to financing and technology
  - Project schedule
  - Methodology
  - Additionality
  - Estimation of GHG emissions
  - Communication with project developer

Plant Oil power generation

for Maritime communities

PIN introduction – Plant oil

Project description	
Objective	Utilize the oil extracted from vegetable oil resources in Fiji for electricity generation and transportation.
Technology	Coconut Oil Extraction
Description	Involves 7 biofuel mills which will utilize the coconut for electricity generation and transportation. ø 365,000L per year ø substitute 341,000L of diesel
Boundary	Matuku, Moala, Lakeba, Vanua Balavu, Gau, Rabi and Kadavu islands (estimated)

PIN introduction – Plant oil

Project Information	
Project Participants	Department of Energy, Fijian Government
GHG Target	CO_2
Total Cost (estimated)	14,118,300 US dollars
O&M Cost (estimated)	448,800 US dollars
Expected Starting Date	2012
Duration of the CDM	21 years
Estimated annual GHG emission reductions	818 t CO_{2e}

PIN introduction – Plant oil

Sector Background & Baseline	
Sector Background	Fiji is heavily dependent on imported fuel to meet a major component of its energy demand The main sources of energy for Fiji are biomass, petroleum products and hydropower No public funding has been indicated for the proposed project.
Baseline	The baseline scenario would be the usage of 341,000L diesel for electricity generation and transportation.

PIN introduction – Plant oil

Methodology & Additionality	
Methodology	AMS-I.G : Plant oil production and use for energy generation in stationary applications AMS-III.T: Plant oil production and use for transport applications
Additionality	"Guidelines for demonstrating additionally of Micro-scale project activities" Fiji is one of the SIDS and the equivalent capacity of electricity generation for 365,000L CNO per year is about 217kw, the proposed project activity is additional.

PIN introduction – Plant oil

Environmental / Social / Economic benefits	
Environment	Ø Greenhouse gas emissions reduction; Ø Impact on resource sustainability and resource degradation
Socio-economic	Ø Reduce imported fossil fuel usage ; Ø Reduce energy cost in the rural areas; Ø Achieves benefits in public health and pollutants reduction
Environmental Strategy	All the proposed project activity shall be in accord with related laws and regulations

PIN introduction – Plant oil

Comments	
Advantages	Ø Plentiful coconut resources Ø The Government also plans to construct a number of coconut oil processing mills, and has experience in practice
Challenges	Ø Investment schedule is uncertain Ø Lack of CDM experience

Lighting Energy Efficiency

Project in Fiji

PIN introduction - LED

Project description	
Objective	Distribute approx. 100,000 light-emitting diodes (LEDs) to substitute equal amount of incandescent lamps (ICLs)
Technology	Lighting efficiency technology
Description	LEDs are more energy-efficient and have longer use life than ICLs. The replacement of ICLs with LEDs will creates less carbon emissions. The distribution range involves the households, the commercial or industrial places and street lighting
Boundary	8 Cities in Fiji (Suva, Nasinu, Sigatoka, Nadi, Lautoka, Ba, Lami, Nausori)

PIN introduction - LED

Project Information	
Project Participants	International Union for Conservation of Nature (IUCN)
GHG Target	CO_2
Total Cost (estimated)	48,070,000 US dollars
O&M Cost (estimated)	50,202,000 US dollars
Expected Starting Date	2013
Duration of the CDM	10 years
Estimated annual GHG emission reductions	3,836 t CO_{2e}

PIN introduction - LED

Sector Background & Baseline	
Sector Background	Heavily dependent on imported fuel in Fiji Lack of energy conservation and efficiency planning, guidelines and effective implementation programme
Baseline	Continue usage of ICLs for lightning 97,144 of 40W ICLs in household/ commercial /industry and 10,739 of 100W in street lighting.

PIN introduction - LED

Methodology & Additionality	
Methodology	AMS-II.C.: Demand-side energy efficiency activities for specific
Additionality	"Guidelines for demonstrating additionally of Micro-scale project activities" Fiji is classified as a SIDS. The proposed project with energy savings no more than 20 GWh (around 7.67GWh) per year Be considered to be automatically additional.

PIN introduction - LED

Environmental / Social / Economic benefits	
Environment	Ø Greenhouse gas emissions reduction; Ø Impact on resource sustainability and resource degradation
Socio-economic	Ø Reducing Mercury vapor, public health and safety will be well protected and secured; Ø Improve the illumination of streets; ØReduce national electricity demand and stress on energy infrastructure ØReduce the maintenance of the infrastructures
Environmental Strategy	Reinforce, support and enact the host country's energy efficiency policies.

PIN introduction - LED

Comments	
Advantages	Ø LED is now a mature technology Ø The Government has encourage consumers to use energy efficiently projects
Challenges	Ø IUCN hasn't been authorized to implement the project Ø Investment needs to be sourced from overseas

Tropik Biomass Power Generation Project

www.easy-carbon.com

PIN introduction - Biomass

Project description	
Objective	Utilize local biomass residues (mainly wood waste) for electricity generation
Technology	Boiler, steam turbine and generator, and auxiliary system
Description	With the installed capacity of around 9.3MW, the proposed project uses the log generated from Tropik Wood Industries Limited. The total power generated is 61,100MWh per year in which around 42,700MWh supplies to the grid.
Boundary	Lautoka

PIN introduction - Biomass

Project Information	
Project Participants	Tropik Wood Industries Limited
GHG Target	CH_4 and CO_2
Total Cost (estimated)	13.4 million US dollars
Capital Cost (estimated)	13.4 million US dollars
Expected Starting Date	2010 when project restart operation
Duration of the CDM	21 years
Estimated annual GHG emission reductions	21,000 t CO_{2e}

PIN introduction - Biomass

Sector Background & Baseline	
Sector Background	Fiji is heavily dependent on imported fuel to meet a major component of its energy demand No public funding has been indicated for the proposed project.
Baseline	The electricity delivered to the grid by the project activity would have otherwise been supplied by the operation of grid-connected power plants and addition of diesel generation capacity to the Fiji grid.

PIN introduction - Biomass

Methodology & Additionality	
Methodology	AMS-I. D : Grid connected renewable electricity generation
Additionality	“Tool for the Demonstration and Assessment of Additionality ” Potential barrier analysis in terms of financial barriers and technology barriers

PIN introduction - Biomass

Environmental / Social / Economic benefits	
Environment	Ø Greenhouse gas emissions reduction; Ø Local air quality will be directly improved
Socio-economic	Ø Promote the energy independence from fossil fuel import; Ø Reduce energy cost in the rural areas; Ø Provide employment opportunities for local technicians
Environmental Strategy	In accord with the “long-term sustainability” principle of the National Climate Change Policy and meet the “mitigation” objective in the National Climate Change Policy.

PIN introduction - Biomass

Comments	
Advantages	Ø Sufficient wood resources Ø Project in operation with steady delivery
Challenges	Ø Restart CDM activity and lack of evidence for CDM consideration after starting of CDM activity

Development for regular CDM project

Qaliwana Hydropower Project

Qaliwana Hydropower Project

Project description	
Objective	Replace the current GHG intensive energy generation in the grid with hydropower and improve the water utilization of the Nadarivatu Renewable Energy Project
Technology	Dam construction, turbine
Description	Construct a 62m high, concrete gravity dam on the Qaliwana River at its junction with the Nadala River. Ø Design flow of 15 m^3/s Ø Design turbine rating of 18.6MW,
Boundary	The project activity and all power plants connected physically to the FEA grid on Viti Levu

Qaliwana Hydropower Project

Project Information	
Project Participants	Fiji Electricity Authority
GHG Target	CO_2
Total Cost (estimated)	98,449,780 US dollars
Expected Starting Date	2014
Duration of the CDM	21 years
Estimated annual GHG emission reductions	19,717 t CO_{2e}

Qaliwana Hydropower Project

Sector Background & Baseline	
Sector Background	Fiji is heavily dependent on imported fuel to meet a major component of its energy demand
Baseline	Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by addition of new generation sources

Qaliwana Hydropower Project

Methodology & Additionality	
Methodology	ACM0002 : Consolidated baseline methodology for grid- connected electricity generation from renewable sources
Additionality	“Tool for the Demonstration and Assessment of Additionality ” investment analysis

PDD Development - Additionality

- Barrier analysis

  Fiji has similar hydro power experience for some time (not feasible)

- Investment analysis

  - Option I: Simple cost analysis
  - Option II: Investment comparison analysis
  - Option III: Benchmark analysis

"Guidelines on the assessment of investment analysis"

The default values for the expected return on equity shown below are calculated after taxes.

	Moody's Rating for Bonds	Group 1	Group 2	Group 3
Afghanistan		14.5	15.5	14
Albania	B1	13	14	12.5
Egypt	Ba1	12	13	11.5
El Salvador	Ba1	12	13	11.5
Equatorial Guinea		10.5	11.5	10
Eritrea		14.5	15.5	14
Ethiopia		14.5	15.5	14
Fiji	B1	13	14	12.5
The former Yugoslav Republic of Macedonia		12.9	13.9	12.4
Gabon		11.75	12.75	11.25
Gambia		13.75	14.75	13.25
Georgia		12.9	13.9	12.4

Group 1:
1. Energy Industries;
2. Energy Distribution;
3. Energy Demand;
15. Waste handling and disposal.

Group 2:
4. Manufacturing industries;
5. Chemical Industries;
6. Construction;
7. Transport;
8. Mining/Mineral production;
9. Metal production;
10. Fugitive Emissions from fuels;
11. Fugitive Emissions from production and consumption of halocarbon. and Sulphur hexafluoride;
12. Solvent use.

Group 3:
14. Afforestation and reforestation;
15. Agriculture.

PDD Development for Qaliwana Hydropower

- Emission factor calculation-OM
  - Simple OM
  - Simple adjusted OM
  - Dispatch data analysis OM
  - Average OM

$$EF_{OM,average,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{OM,average,y}$	Average operating margin CO_2 emission factor in year y (tCO2/MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh);
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
m	All power units serving the grid in year y, including low-cost/ must-run power units;
y	The relevant year as per the vintage chosen in Step 3.

Table B. 6. Contribution of low cost and "must run" sources to overall power generation in Fiji

Year	2005	2006	2007	2008	2009	Average
Percentage share of low cost and "must run" power station, namely predominantly hydropower plants and wind plants	50.9%	50.3%	70.8%	69.9%	64.2%	61.2%

PDD Development for Qaliwana Hydropower

- Emission factor calculation-BM

The sample group of power units *m* used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\%}$, in MWh);

(c) From $SET_{5\text{-units}}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

PDD Development for Qaliwana Hydropower

- Supporting documents to be collected for the development
  - Consistency with mandatory laws and regulations
  - Geographical coordinates of the project
  - The technical specification of the applied equipment
  - Prior consideration of the CDM
  - Documentation for Investment, technological or other barriers confronted by the proposed project, and financial figures, etc
  - Information for emission reduction calculation, especially the latest data from the power grid
  - Stakeholder consultation records

THANKS FOR YOUR ATTENTION!

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